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Impact of 'Irrelevant' Information During Intertrial Intervals on Contingency Ratings

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Impact of 'irrelevant' information during intertrial intervals on contingency ratings

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Abstract

The co-ocurrence of the co-absence of two potentially associated stimuli (D-cell events) influences contingency judgments. We previously found manipulating co-absence frequency had more effect than co-absence duration on contingency judgments. We hypothesized filling the co-absence periods with irrelevant information ('Trash') would better clear working memory, resulting in stronger learning. We have found this not to be the case and discuss possible reasons for this observation.

Background

- Contingency learning can be defined as the learning of the correlative relationship between two stimuli, with Positive = Likely to occur together, and Negative = One occurs in the absence of the other.

	Outcome (O)	No Outcome (NC)
Cue (C)	A (co-occurrence) a	B b
No Cue (NC)	C c	D (co-absence) d

- Co-absence- the absence of both target stimuli. Often considered an intertrial interval (ITI)
- Like co-occurence, co-absence increases objective contingency
- Learning of contingency is well described by the Δp:

$$\Delta P = [p(O \mid C)] - [p(O \mid NC)] = \left[\frac{a}{a+b}\right] - \left[\frac{c}{c+d}\right]$$

Trial Spacing Effect and the D-Trial

Accounts for the Trial Spacing Effect:

1. Provides more processing time for recent past A, B, and C events.
2. Clear working memory for future A, B, and C events.
3. Extinction of context.
4. Encoding variability.
5. Sensibility to objective contingency (Δp).

D-Trial Manipulation

•Previous work found that manipulating frequencies of A, B, C, and D trials influenced ratings in accord with ΔP.

• Increasing frequency of D trials increased ratings more than did duration of D trials, particularly with negative contingency.
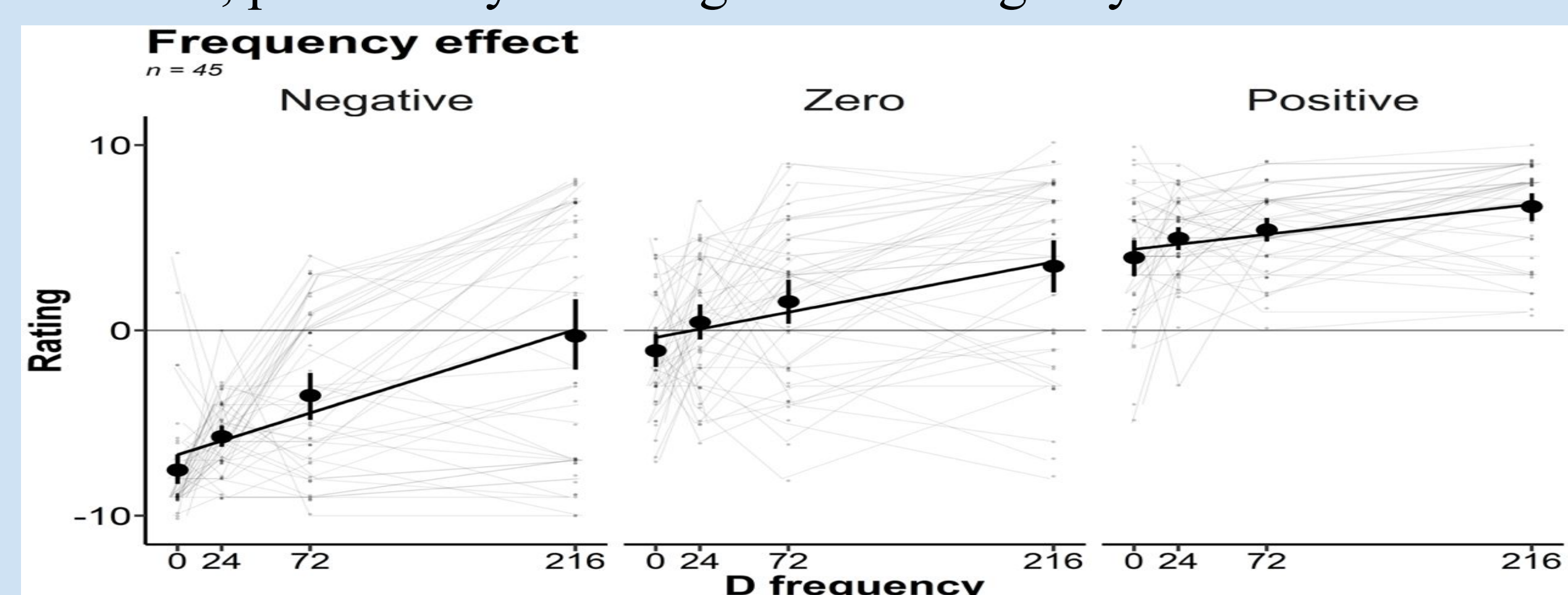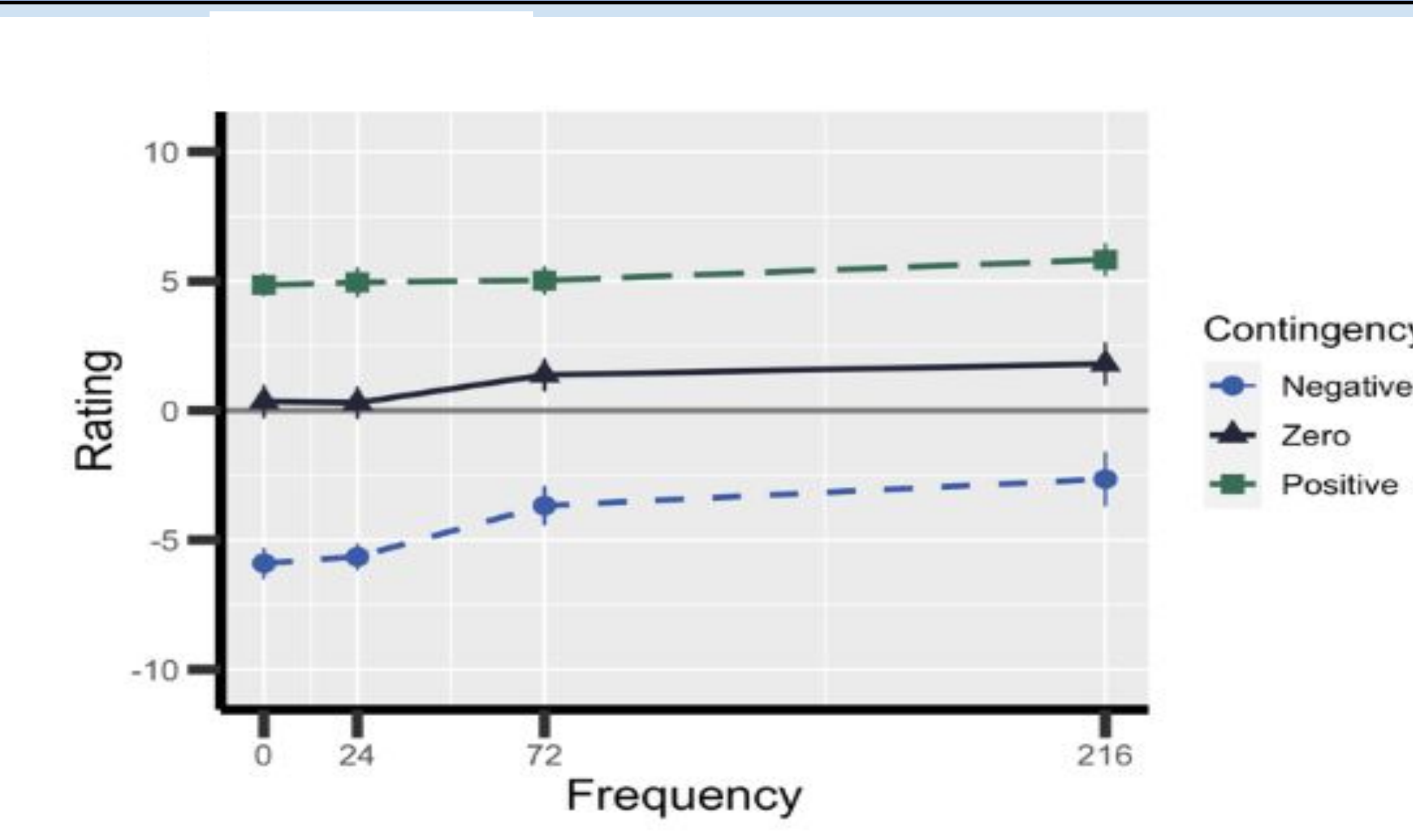

Experiment 1

- **Question: Are our previous results of increasing frequency of D trials replicable?**
- Differences: Conducted online, different experimenters, & different program.
- Within-subjects design.
- Duration of all events (A, B, C, & D) held constant (450 ms)
- Positive (A > B), Zero (A = B), Negative (A < B) contingencies.
- D Trial Frequencies: 0, 24, 72, and 216.
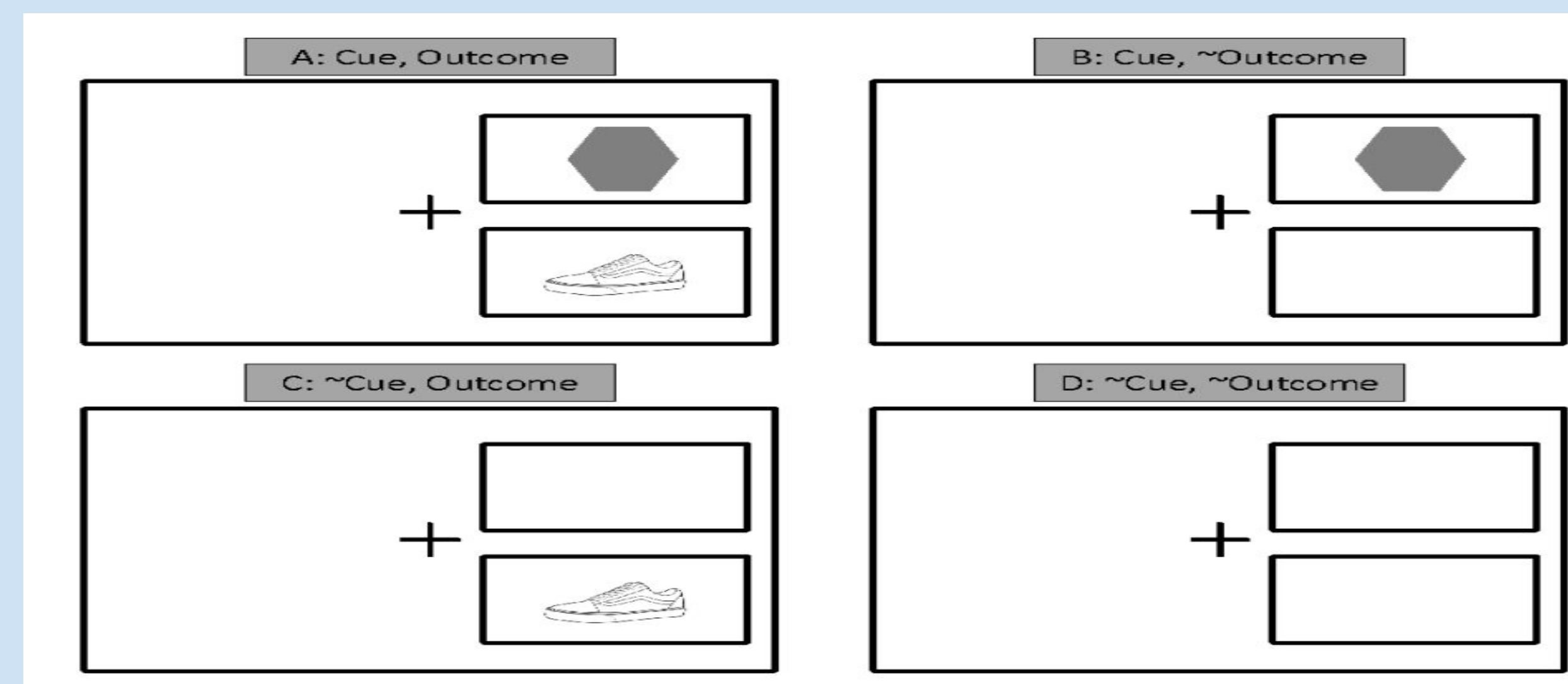
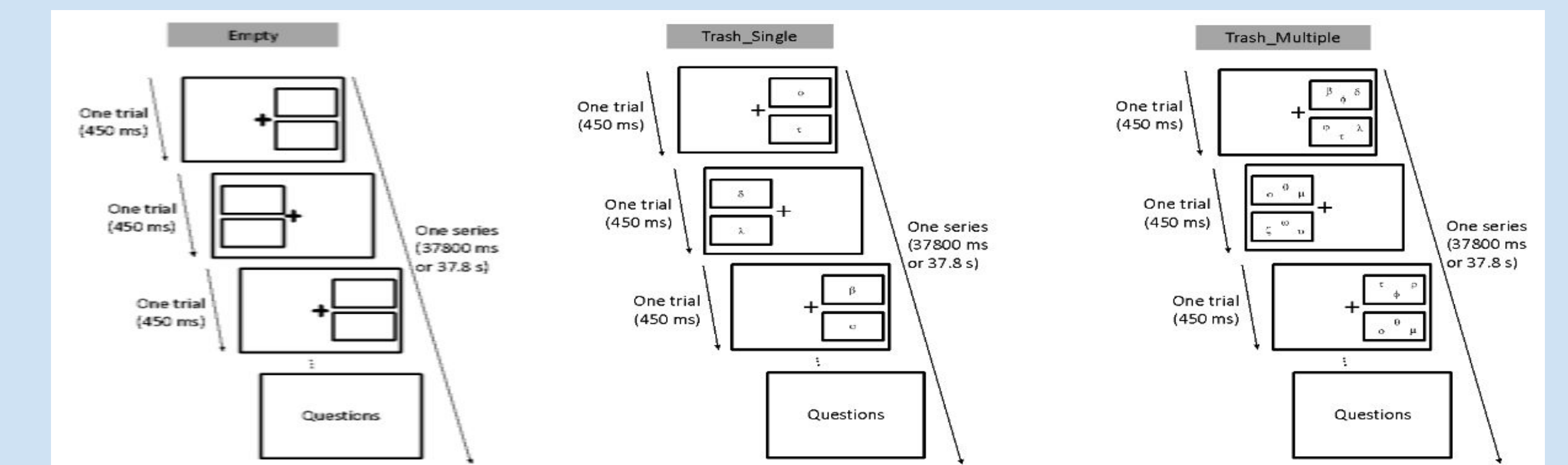| Negative		Zero		Positive	
4	44	24	24	44	4
24	**0**	24	**0**	24	**0**
4	44	24	24	44	4
24	**24**	24	**24**	24	**24**
4	44	24	24	44	4
24	**72**	24	**72**	24	**72**
4	44	24	24	44	4
24	**216**	24	**216**	24	**216**

Experiment 1 Results

Results: Replication was a success. An increase in frequency for the D events produced an increase ratings on contingency for all contengencies, and particularly again with the negative contingency.
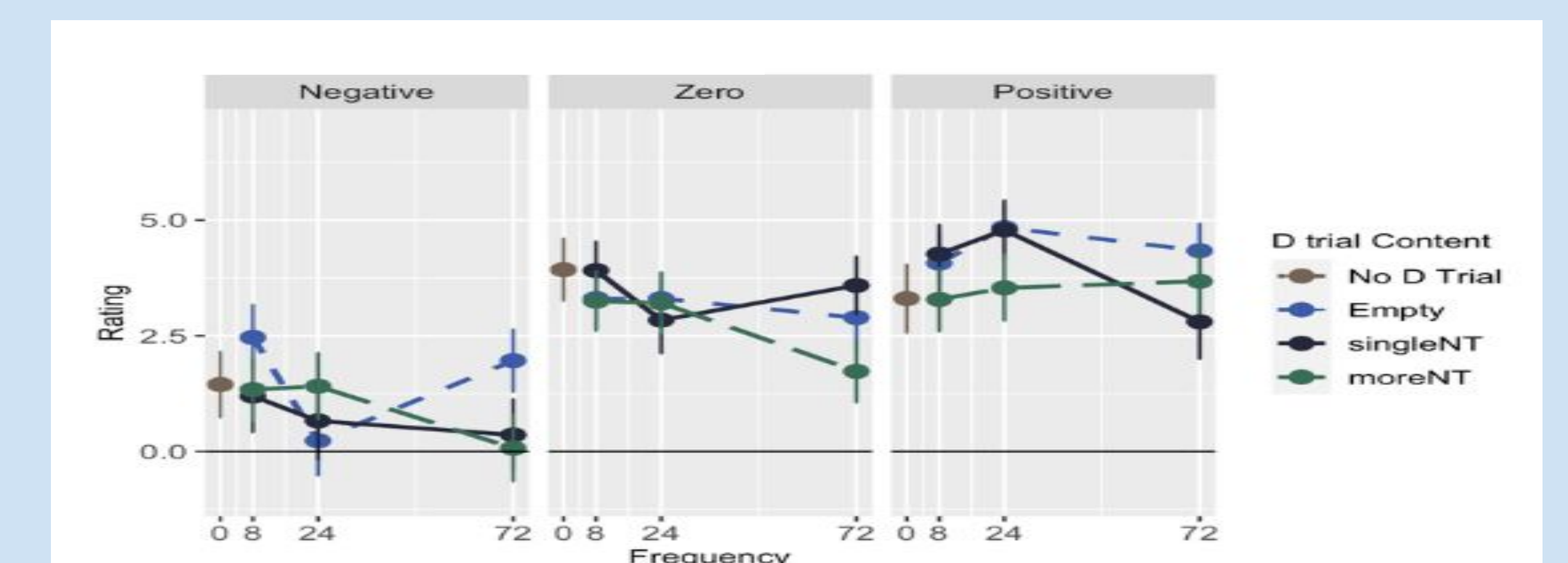
Experiment 2

- **Question: Do contingency ratings change with D-trial content (Trash)?**
- Three objective baseline contingencies (Positive, Zero, Negative).
- Same # of A, B, C trials as in previous experiment.
- Three degrees of Trash: Empty, Trash Single, Trash Multiple.

Contingency	A, B, C Trials	Empty	Trash_Single	Trash_Multiple
Positive	A: 44 B: 4 C: 24	0 8 24 72	0 8 24 72	0 8 24 72
Zero	A: 24 B: 24 C: 24	0 8 24 72	0 8 24 72	0 8 24 72
Negative	A: 4 B: 44 C: 24	0 8 24 72	0 8 24 72	0 8 24 72

Experiment 2 Results

Results: Contingency effect was observed. No significant effect occurred due to frequency nor presence of Trash. Cross conditional effect may have occurred where Trash completely eliminated the effect of the frequency of D events on contingency. ratings.

General Discussion

• Presence of Trash conditions eliminated effect of D frequency.
• Neither frequency nor type of D trial made any difference..
• Possibly insensitive to Trash with current design, i.e.,we were asymptotic with respect to Trash.
• None of the accounts are a great fit, but sensitivity to ΔP was best.
• Trial Spacing effect is robust, but not universal. Not seen with Trash in D-events
• Research in progress in which more D events are added & blocking of conditions by the amount of Trash.